



## *The Daedalean*

**Semper Discens**

*Monthly Aerospace Education Newsletter of the Connecticut  
Wing of the Civil Air Patrol*

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### **CALENDAR**

01 DEC-CAP'S 68th Anniversary  
02 DEC-Wing Squadron and Staff Call

### **ATTENTION AEOS ANNUAL REPORTS DUE**

The annual Squadron reports are due by 15 January, 2010. An email version of this report has been sent with this newsletter. For your convenience, this form may be filled out directly and emailed back to the DAE, [srocketto@aquilaasys.com](mailto:srocketto@aquilaasys.com). All an AEO needs to do is look up some facts, enter them on the form, and hit "reply."

### **AEOS-HELP NEEDED**

The Daedalean is soliciting articles from AEOs, Officers and Cadets on topics of aerospace interest. Events, history, aircraft types, field trips, and curricula ideas are all welcome. Send your contributions to [srocketto@aquilasys.com](mailto:srocketto@aquilasys.com)

### **103rd VISITS INTREPID A&S MUSEUM**

The 103rd at the Intrepid Sea, Air and Space Museum, November 14th in NY.



*The 103rd at the "Fighting I"*

The Intrepid Sea, Air & Space Museum opened in 1982. The Museum is centered on the aircraft carrier Intrepid (CVS-11).



*Dassault Etendard IVM ground attack aircraft,  
arguably the first successful French naval jet.*



*Fleet Air Arm Scimitar, the first swept wing single  
seat British naval jet and the last product of the  
legendary Supermarine Aircraft Company.*

In 1943, Intrepid was commissioned as CV-11, the third of the *Essex Class* carriers and served proudly in World War II. She went on to serve as one of the primary recovery vessels for NASA, three tours of duty off Vietnam, and submarine surveillance in the North Atlantic during the Cold War. The U.S.S. Essex also was the first U.S. carrier to launch aircraft with steam catapults.

## **CAP'S 68th ANNIVERSARY**

The Civil Air Patrol was founded when a trio of aviation minded citizens convinced the U.S. government of the utility of a volunteer force of aviators who would stand ready to assist in times of national emergency.

Gill Rob Wilson, Thomas Beck, and Guy Gannett, all involved in newspaper and magazine publication, put together a plan to organize civil aviation interests to support the military in the impending war. They submitted the plan to the Director of the Office of Civil Defense, New York Mayor, Fiorello LaGuardia, an aviator in the "War to End Wars." LaGuardia approved the plan and it was submitted to a board appointed by General "Hap" Arnold which then allocated army support.

On December 1, 1941, LaGuardia signed Administrative Order 9 and the Civil Air Patrol was born and placed under the command of Maj. Gen. John Curry. Wartime duties involved anti-submarine patrols, courier flights, anti-aircraft training missions, border patrols, and cadet training. Fifty-nine CAP members died in the line of duty.



*NEAM Stinson 10, Spirit of Latana, Fitted with Bomb for Anti-sub Work*

After the war, CAP went through a number of changes and was made the official auxiliary of the USAF in 1948.

Today, CAP membership stands around 60,000 members organized in 52 Wings. The volunteer members stand ready with over 500 aircraft and

1000 vehicles to meet the obligations of their three federally mandated missions: Emergency Services, Aerospace Education, and Cadet Programs. CAP flies over 90% of the USAF continental search and rescue missions, works with Homeland Security departments, local, state, and federal law enforcement agencies, public emergency service providers, schools, and a variety of external organizations to provide assistance when required.

## **HISTORY ARTICLE OF THE MONTH**

### **COLONEL JOHN PAUL STAPP, PhD, MD "The Fastest Man on Earth"**

Not all aviation heroes are pilots or even air crewman. John Paul Stapp achieved fame as the fastest man on land but that was only a means to an end; to make the fastest survivable stops! John Paul Stapp was born in Bahia, Brazil, the son of missionary parents and teachers. Home schooled until the age of 12, he was then sent back to the United States and received his secondary education in Brownwood, Texas. He received a B.A in English and was interested in a writing career but decided to train in medicine after nursing a fatally burned infant cousin. Financially strapped and unable to afford medical school, Stapp earned an M.A in zoology at Baylor and taught for two years. His financial condition was so critical that the school's lab animals supplemented his larder. He commented that "If it breathed it had protein and if it had protein I ate it. He then enrolled at the University of Texas in Austin and received a Ph.D. in biophysics and followed up by entering the medical program at the University of Minnesota. Upon completion of his degree requirements, in 1944, enlisted in the U.S. Army.

"Hap" Arnold, Commanding General of the Army Air Corps believed in promoting research on advanced concepts germane to aviation. He established relationships with academic

institutions and entered into a long term relationship with Theodore von Karman, arguably the foremost aerodynamicist in the country. As a result, the Scientific Advisory Group was formed.

Their recommendations led to the establishment of the RAND Corporation and the Air Engineering Development Center (now the Arnold Engineering Development Center) and research in a myriad of aviation related projects such as JATO, swept wings, and aviation physiology.

After transfer to the Army Air Corps, Stapp became interested in aeromedical research. Stapp observed the tests ejection seat tests at Wright Field in 1946. When ejected from a swiftly moving aircraft at altitude, a pilot faces a range of dangerous conditions: acceleration, wind blast, sub-zero temperatures, decompression sickness, and hypoxia. Stapp saw the challenge in developing methodologies to protect the aviator from these hazards and reenlisted. His first assignment was testing a liquid oxygen breathing under the auspices of the Aeromedical Laboratory of the Air Material Command.

Stapp soon learned of a new project involving studies of the effects of high rates of deceleration upon the human body. He visited Moscow to examine a rocket powered rail car which the Russians had captured from the Germans. Soon, he found himself at Muroc Air Base, Mojave, California working with Northrop Aircraft engineers who had built a 2,000 foot track and rocket sled. The sled was propelled down the track by rocket motors and brought to an extremely quick stop by means of a mechanical braking system. Stapp volunteered as human guinea pig on many of these runs. The now U.S. Air Force was able to test and modify restraint harnesses and seating positions which might best protect crew and passengers which are incurred during crashes. New standards were set for crew seat construction, improved harnesses entered the supply system, and

the rearward facing seat found its place in military passenger aircraft.

Stapp also volunteered for the wind blast experiment. The Air Force was interested in determining the speed limit at which a pilot could still operate ejection seat controls if the canopy of the aircraft was lost. Stapp strapped himself in the rear seat of a Northrop F-89 Scorpion which had its canopy cut away. From 20,000 feet, the pilot dived the aircraft and accelerated to 570 miles per hour and Stapp not only survived but developed a procedure to operate the ejection seat controls.

Stapp questioned the Air Force belief that a man could not survive a deceleration in excess of 18 Gs. The crucial point was that restraints and harnesses were constructed to meet the 18 G criterion. Stapp theorized that a man could survive much higher G loads and if so, aircraft restraint systems and seats were insufficient to protect the crews. The Air Force disagreed and Stapp was forced to resort to techniques which pushed the envelope of Air Force regulations guiding resource acquisition and allocation in order to advance his projects.

The conservative Air Force kept tight reins on financial and material resources needed to run Stapp's research and was ever wary of any efforts that were outside the traditional framework so Stapp was neither fully funded nor granted full approval by his superiors. For a man who once sustained himself on lab animals and was intellectually and spiritually driven to solve the problems of survival in the unfriendly skies, such a challenge was irresistible. Stapp resorted to a method known as "bootleg" research, applying his clever mind to ways to "beg, borrow, or steal" what he needed. If you succeed you are a hero. If you fail, you face court martial. Eventually, Stapp's data proved convincing to authorities in the aeromedical branch and, although cautioned against personal involvement as an experimental subject, he was offered a new assignment.



*Sonic Wind  
No. 1 on  
Display at the  
New Mexico  
Museum of  
Space History*



*The Business End  
of Sonic Wind No.  
1*

In 1951, Stapp arrived in New Mexico's Tularosa Basin where, at Holloman Air Force Base near Alamogordo, New Mexico awaited Sonic Wind No. 1, a Northrop built rocket sled. The sled could be powered by up to twelve solid fuel rocket motors delivering up to 40,000 pounds of thrust which could cause accelerations in the neighborhood of 20 times that of gravity but the real test awaited the rider at the end of the 3,500 foot track. Specially designed vanes would deploy into troughs of water paralleling the track and rapidly, very rapidly, bring the sled to a stop. On December 10th, 1954, after preliminary testing and ignoring the order to serve as an experimental subject, Stapp was strapped into place and the rockets were fired. A new and still existing world record for a manned rocket sled of 632 miles per hour was achieved and then, in about a second of time, the sled was braked to a halt. A G load of 46.2 times the force of gravity was imposed on Stapp's body.



His face contorted and the capillaries in his eyes ruptured. The force of the eyeballs hitting his eyelids inflicted two enormous black eyes.

But the injuries were not permanent and the data gathered proved that aircrew safety devices were deficient. Stapp's work led directly to new harnesses, reinforced seats, and ejections systems which met the higher standards and increased the air crewman's chance of survival.

The standard unit which measures exposure to acceleration, the stapp or g's has been named in his honor. For example, a pilot in a 60° banked turn pulls two g's. If the turn is maintained for 10 seconds, he is subjected to 20 stapps.

Interestingly, Stapp's work also resulted in the formulation of the first of the famous "Murphy's Laws." Capt. Edward Murphy, Jr. was the engineer in charge of the electrical gauges used to measure the strain on the seat harnesses. When tested, the four gauges yielded no data and an examination revealed that there were two ways to wire them, one correct and one incorrect. All of them had been incorrectly wired and so the most common variation of Murphy's First Law was born: "If anything can go wrong, it will."

His remarkable ride (and fast stop) did attract some national publicity. In 1955 he was on the cover of *Time*, featured in *Colliers* and *Life* magazines, became the guest subject on the tv program, *"This is Your Life."*

Stapp's breadth of knowledge of technology attracted him to research on the frontiers of space. The concept of "space travel" was regarded by the Air Force as a shibboleth of "wild eyed visionaries" He was deeply involved with Project Manhigh. Manhigh's objective was to investigate the biological hazards faced at extreme altitudes. Stapp recruited three stalwart pilots, Maj David Simons, a doctor, Capt Joseph Kittinger, who flew

chase in a Lockheed T-33 during the record sled run, and Lt Clifton McClure, an engineer and pilot. On three flights, the balloons reached altitudes on the order of 100,000 ft and stayed aloft for as long as 32 hours. Valuable data was gathered on the effects of cosmic rays on the human organism and the techniques for operating balloons at altitude.

Stapp also promoted the investigation of high altitude parachute jumps. Capt Joe Kittinger was transferred to the Escape Section of The Laboratory and participated in what Stapp named Project Excelsior. Borne aloft by balloon, Kittinger's third jump, in 1961, set the world altitude record for a parachute jump when he departed the gondola at 108,200 feet and made a free fall of almost five minutes before deploying his parachute at 18,000 feet.

The aeromedical work did not end with the spectacular rocket sled rides and high altitude balloon flights. Stapp's ever observant scientific character noted that the USAF was losing more men each year in auto accidents than in aircraft accidents. He advocated the use of lap belts and working with industry and the Society of Automotive Engineers, promoted the use of anthropomorphic dummies in crash research and fostered research ideals which led, in aircraft or ground vehicles to three point restraint harnesses, padded dashboards, air bags, and rearward facing seats. For almost a half century, the SAE has sponsored the annual Stapp Car Crash Conference named in honor of Stapp and dedicated to improving the chances of survivability of passengers in automobile accidents.

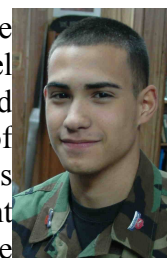
At the age of 89, Col Stapp went West on November 13, 1999. His honors include the Legion of Merit, the Presidential Medal of Technology, and membership in the National Aviation Hall of Fame and the Space Hall of Fame. He also collected two broken wrists, a bunch of rib fractures, and repeated retinal hemorrhages.

Stapp's sterling character stands as a paradigm of leadership. He had vision, intellectual prowess, a keen sense of humor, determination, a crusading spirit and valor above and beyond that which his office demanded. The multitudes who have survived vehicle crashes due to the safety devices which his work developed or fostered are the true fruits of Colonel John Paul Stapp's courage.

## **AIR TRAFFIC CONTROL TOWERS**

by  
C/A1C Jorge Barberan Jr.

Air traffic control (ATC) is a service provided by ground based personnel who direct aircraft on the ground and in the air. The primary purpose of ATC systems worldwide is to separate aircraft to prevent collisions, to organize and expedite the flow of traffic, and to provide information and other support for pilots. In some countries, ATC may also play a security or defense role or actually be run by the military. With the U.S. Civil Air Patrol I've been able to experience what ATC is like from both the cockpit and the tower.



While on an orientation flight, I learned that you cannot always rely on ATC to alert you to the close proximity of another aircraft. When flying, it is important for the crew to maintain constant vigilance. Once I saw another Cessna aircraft at three o'clock and a bit higher than us. The instructor was talking to me and looking down at the instruments so I said, "Sir, traffic, 3 o'clock high." "Roger, traffic in sight," and we flew right under the other plane. It was an amazing feeling for me, considering that many people never get the opportunity to do and say such things. In addition to its primary function, the ATC provides additional services such as weather and navigation information. When controllers are responsible for separating some or all aircraft, the airspace is called "controlled airspace" in contrast to

"uncontrolled airspace" where aircraft may fly without the use of the air traffic control system. Depending on the type of flight and the class of airspace, ATC may issue instructions that pilots are required to follow or merely flight information to assist pilots operating in that airspace. So if there is an aircraft near you but you are not in controlled airspace, you are responsible for seeing and avoiding other traffic.

In 1919, The first attempts to provide a semblance of air traffic control were based on simple "rules of the road." Archie League, who used colored flags at what is today's Lambert-St. Louis International Airport, is often considered the first air traffic controller. In the United States, The first air traffic regulations were established by the Air Commerce Act in 1926. Four years later, in 1930, control towers were equipped with radios. By 1935 several airlines jointly established the first Airway Traffic Control centers to enhance traffic flow and expedite aircraft movements. Airlines using the Chicago, Cleveland, and Newark airports agreed to coordinate the handling of airline traffic between those cities. In 1936 this preliminary effort was transferred to the Federal Government, and the first generation Air Traffic Control (ATC) System was born and in December, the first Airway Traffic Control Center opened at Newark, New Jersey.

The primary method of controlling the immediate airport environment is visual observation from the control tower. The tower is a tall, multi-windowed structure located on the airport grounds. Tower controllers are responsible for the separation and efficient movement of aircraft and vehicles operating on the taxiways and runways of the airport itself, and aircraft in the air near the airport, generally 5 nautical miles.

Ground Control is responsible for the airport "maneuvering" areas. This generally includes all taxiways, inactive runways, holding areas, and some transitional aprons or intersections. Exact

areas and control responsibilities are clearly defined in local documents and agreements at each airport. Any aircraft, vehicle, or person walking or working in these areas is required to have clearance from the ground controller. During my visit to the Groton-New London (GON) tower, state vehicles which were plowing snow required clearance from ground control to cross taxiways and runways. This is normally done through VHF radio, but there may be special cases where other methods are used. Aircraft or vehicles without radios will communicate with the tower *via*, to my amazement, aviation light signals. A gun-like device tower hangs from the tower ceiling and can transmit a beam of red, green, or white lights in various combinations to inform vehicles without radios about appropriate actions such as "cleared to land" or "exercise general caution."



*TRCS Cadets at Westover Tower. Note the light signal gun, familiarly known as a "biscuit gun."*

Runway capacity and weather are major factors in maintaining on-time operations. Rain or ice and snow on the runway cause landing aircraft to take longer to slow and exit which reduce the arrival rate and requiring more space between landing aircraft. I visited GON during the winter and it had snowed the day before. Taxiway Charlie was closed due to ice. Fog also required a decrease in the landing rate. These, in turn, increase airborne delay for holding aircraft. If more aircraft are scheduled than can be safely and efficiently held in the air, a ground delay program can occur, holding aircraft which wish to depart.

The day-to-day problems faced by the air traffic control system are primarily related to the amount of traffic within the system. Each landing aircraft must touch down, slow, and exit the runway before the next crosses the beginning of the runway. This process requires at least one and up to four minutes. Allowing for departures between arrivals, each runway can handle about 30 arrivals per hour. A large airport with two active runways can handle about 60 arrivals per hour in good weather. Problems begin when airlines schedule more arrivals into an airport than can be physically handled, or when delays elsewhere cause groups of aircraft that would otherwise be separated in time to arrive simultaneously. Aircraft must then be delayed in the air by holding over specified locations until they can be safely sequenced to the runway.

Up until the 1990s, holding, which has significant environmental and cost implications, was a routine occurrence at many airports. Advances in computers now allow the sequencing of planes hours in advance. Planes may be delayed before they even take off, or may be told to reduce power in flight and proceed more slowly significantly reducing the amount of holding. The Federal Aviation Administration and many aerospace organizations continue to work to improve the equipment and procedures in order to minimize delays which in turn reduce fuel and operating costs.

### **SOME CAP AIRCRAFT FROM THE PAST**



*Piper J-3 Cub Displays the Classic Clark-Y Airfoil*



*Sikorsky S-39 Amphibian, Little Brother of the twin engined S-38.*



*Fairchild 24, Known to the Army Air Corps as the UC-61 carrying the Ranger in-line engine.*



*Another Flavor of Fairchild 24, equipped with a Warner Scarab radial engine.*

